

## Impact of Health Information Technology on Primary Care Workflow and Financial Measures

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<b>Organization:</b>	Baylor Research Institute
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**Summary:** Little is known about the impact of commercial off-the-shelf electronic health record (EHR) systems on primary care workflow and financial measures, or about the financial and non-financial costs of implementation and maintenance of these systems. Given the goal of universal EHR use in the United States, such knowledge is of immediate and critical importance for the multiple stakeholders in the health care delivery arena.

The HealthTexas Provider Network (HTPN), a large fee-for-service ambulatory care physician network affiliated with an integrated health care delivery system in North Texas, began a staggered 3.5-year roll-out of GE Centricity, an ambulatory EHR system, in mid-2006. Using billing and administrative data, the investigators prospectively examined the impact of the implementation and maintenance of the ambulatory EHR on 26 primary care practices' workflow and financial measures. Investigators also examined the financial resources consumed and the non-financial time and effort costs of the HTPN implementation team and practice physicians, nurses, and office staff preparing for implementation.

The study aimed to better understand frequently-cited perceived barriers to ambulatory EHR adoption, including uncertainty regarding financial and non-financial costs of implementation, loss of productivity during implementation, interference with workflow, and return on investment. Reducing uncertainty in these areas should inform real-world health information technology (IT) implementation decisions and stimulate more comprehensive health IT implementation research in ambulatory care settings.

### Specific Aims:

- Estimate the effect of the EHR on workflow outcome measures. (**Achieved**)
- Estimate the effect of the EHR on financial measures. (**Achieved**)
- Quantify financial and non-financial costs of implementation and maintenance, providing information regarding perceived barriers and facilitators to adoption and implementation of the EHR. (**Achieved**)

**2011 Activities:** The majority of the work on this grant was completed in 2010, including the completion of the last aim. Dr. Fleming and his team used a 3-month no-cost extension to complete the analysis for the first two aims, as well as manuscript and final report preparation. This project was completed April 2011.

**Preliminary Impact and Findings:** Results for the third aim were published in the March 2011 volume of Health Affairs, [“Financial and Non-financial Costs Associated with Electronic Health Record Implementation in the Primary Care Setting.”](#) The analysis takes into account both hardware and software

purchases and the time and effort invested in implementation. They estimate the EHR and practice teams spent 611 hours per practice for implementation, and end-users spent 134 hours per physician. For a five-physician practice, implementation cost an estimated \$162,000, with \$85,500 in maintenance expenses during the first year. These results highlight the often hidden costs of EHR implementation, in terms of the time and effort required by individuals at both the leadership and practice level.

Another major concern creating a barrier to EHR adoption is the fear that it is a risky investment that decreases provider productivity and increases practice expenses. In order to assess the impact of the EHRs on productivity, the team examined relative value units (RVUs) and visits per physician full-time equivalent (FTE). RVUs are used to compare the amount of resources required to perform various services between or within an organization's departments. Work RVUs per-physician FTE did decrease after EHR implementation, representing a drop in productivity. RVUs were 8 percent lower during the first 6 months following implementation, but rebounded to 4 percent lower than pre-implementation levels by 12 months post-implementation. Visits per-physician FTE followed a similar pattern, dropping 8 percent from pre-implementation levels during the first 6 months after EHR implementation, recovering to 4.5 percent lower than pre-implementation after 12 months.

Net income also decreased initially, but after 12 months was not different than pre-EHR levels. Physician expense increased to about \$1,650 per-physician FTE per month, which is approximately the per-physician monthly cost of EHR maintenance costs. While fears of increased expenses and decreased productivity during the initial period after EHR implementation are justified, they are not as large or persistent as thought, with a return to pre-implementation baseline levels after 12 months.

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**Target Population:** Adults, Pediatric\*

**Strategic Goal:** Develop and disseminate health IT evidence and evidence-based tools to support patient-centered care, the coordination of care across transitions in care settings, and the use of electronic exchange of health information to improve quality of care

**Business Goal:** Knowledge Creation

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*\*This target population is one of AHRQ's priority populations.*